

**GUIDELINES FOR GROWTH
SCREENING
IN MISSOURI SCHOOLS**



April 2005

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I. INTRODUCTION

There is currently much interest in the issue of children being overweight. The percentage of children and adolescents who are overweight or at risk for being overweight is increasing at alarming rates. Recent screening programs have determined that children and adolescents in Missouri exceed national rates for risk of being overweight. Overweight is an important chronic medical problem that can be treated.

Missouri schools have traditionally assessed the growth in children by frequent weighing and measuring. A literature search in 2004 revealed there is no scientific evidence that an individual benefits from this measurement activity in the prevention of being overweight. However, a well-planned program of screening for growth abnormalities that included school and community interventions could have public health benefit. For an individual to benefit, the individual must be motivated to lose weight, have access to effective methods to reduce body fat, and must maintain results of their weight loss. This is uncommon in school-age children. Aggregate information regarding the prevalence of children who are at risk for overweight, or who already are identified as overweight, using best practices for measurement and referral, e.g., Body Mass Index, can be useful in designing school and community-based interventions to increase physical activity and to improve the school nutrition environment.

Public health-based criteria for screening programs reinforce the need to have resources for identified problems. A survey of Missouri schools in spring 2004 revealed that screening programs were not standardized regarding periodicity, methods of measurement or types of referral. Other than some referrals to primary care providers for assessment of risk for cardiovascular disease and type 2 diabetes, few interventions were noted.

Current school health guidelines recommend assessing growth and nutritional status in students when they enter the school system, identifying those students who fall outside the norms for age, monitoring those at risk, and providing follow-up and referral for those who meet referral criteria. School districts assessing growth in children and adolescents are urged to screen accurately using standardized techniques, calibrated accurate equipment, and reliable, trained measurers. Following the Centers for Disease Control and Prevention (CDC) protocols for weighing and measuring will improve accuracy and allow the screeners to use the established national norms on the CDC-approved growth charts for comparison. Guidelines for accurate weights and measures, training in the use of standardized growth charts, and training for health care professionals in screening, assessment and management of overweight in children and adolescents are available on-line from various websites (see [Appendix G](#), Resources).

As with any screening program, the availability of resources for referral and follow-up is critical. In the absence of referral sources, the data from growth screening programs should be used to develop interventions in the school and community to increase physical activity and to improve the school nutrition environment. A literature search revealed a number of interventions that may impact the issue of overweight children and adolescents (see [Appendix F](#), School Based Interventions).

II. PRESCREENING EDUCATION

It is helpful to discuss the purpose of any screening with the group to be screened in order to help them understand the reason for, and their role in the screening. Growth screenings are done in order to determine a student's overall nutritional status – how they eat impacts how they grow. Measurements are also done to monitor growth to assure students they are growing as expected, and to collect information that would be helpful to their health care provider if there is a concern.

Students should be told that when they are screened they will need to remove any heavy outer clothing or jackets, may need to empty their pockets if carrying something heavy, and will need to remove their shoes. Their position at the stadiometer and scale should be modeled for them, with the reasons for paying attention to their position. The student should be assured of privacy, that they will be told their height and weight upon request, and that the information will be sent to their parent/guardian.

III. MEASURING HEIGHT

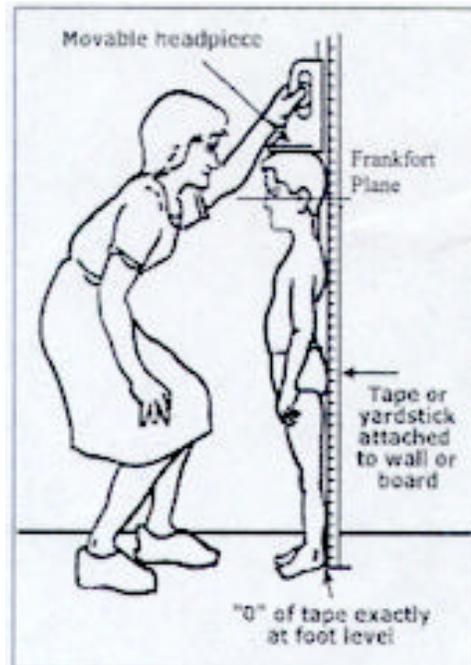
Height should be measured with a stadiometer. This is a vertical board with an attached metric rule and horizontal headpiece. It is mounted on a wall. Height attachments attached to beam scales are inaccurate and should not be used. An alternative to a commercially available stadiometer would be a metal tape permanently affixed to a wall, assuring the tape is accurately placed with “0” at the base of the wall. The wall should not have molding that would prohibit the student's heels being against the wall. In addition, a right-angle horizontal headpiece should be used against the crown of the head to obtain an accurate measurement. Whatever device is used, it should allow measurements to 0.1 cm or 1/8 inch. If portable, the device should be checked to assure it is placed accurately.

A. Procedure

The student should stand on the footplate, or at the base of the measuring device, without shoes and positioned with heels close together, legs straight, arms at sides, and shoulders relaxed. The student should be instructed to look straight ahead and stand fully erect without moving their heels. The heels should not rise off the floor. When possible, the head, back, buttocks and heels should touch the wall. All hair ornaments, buns, braids, etc. should be removed to obtain an accurate measurement against the crown of the head.

A critical element in assessing height correctly is the position of the head. The Frankfort Plane is an imaginary line from the lower margin of the eye socket to the notch above the tragus of the ear (fleshy cartilage partially extending over the opening of the ear). When aligned correctly, the Frankfort Plane is parallel to the horizontal headpiece and perpendicular to the back piece of the stadiometer. When the chin is correctly positioned, the back of the head may not make contact with the vertical surface. At a minimum, two points (head and buttocks, or buttocks and heels) should touch the vertical surface.

The screener should bring the horizontal headpiece down snugly to the top of the head. The screener's eyes should be parallel with the headpiece. The student should be asked to inhale deeply and hold his/her breath. The measurement is then read to the nearest 0.1 cm or 1/8 inch. The student should then be repositioned and re-measured. The measurements should be within 0.1 cm or 1/8 inch of each other. If not, the screener should repeat the measurement and record the average of the two closest measurements.



See [Appendix A](#), Instructions for Measuring Height. This guide could be placed in the screening area to remind screeners of the proper steps.

B. Considerations for Special Populations

If the student is unable to stand erect to be measured, the measurement may be taken with the student lying supine, with feet firmly against a solid surface, such as a wall. Align the student as well as possible, measure the student's length between the wall and the head position with a steel tape measure. A right-angle device should be used against the crown of the head. The screener should note in the record that this was a measurement of **length** rather than stature (natural height in an upright position).

IV. MEASURING WEIGHT

When measuring weight, a calibrated beam scale or electronic scale should be used for accuracy. Privacy should be provided when assessing weight, for personal reasons, and because the removal of heavy clothing and shoes is extremely important to obtain an accurate weight. Privacy may be provided by using a separate room, or by using a portable screen or partition.

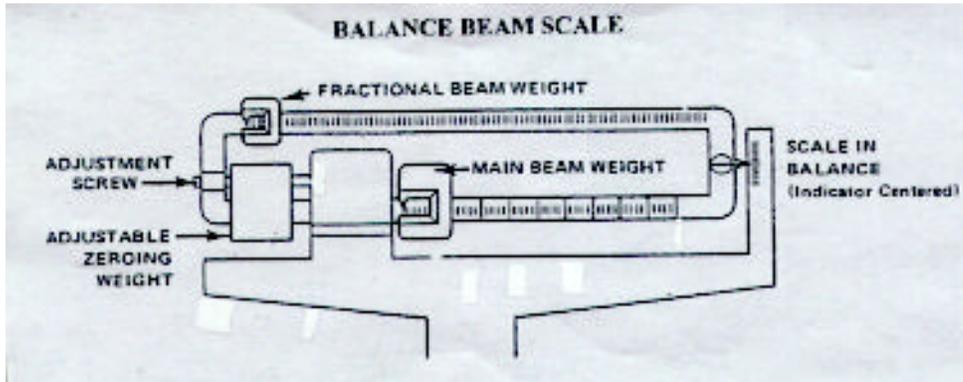
Confidentiality is important and care should be taken that findings are not accessible to other students or shared with staff. Girls are most often concerned about their weight, even if they are not at risk for being overweight, and boys worry about being too short or too thin. Students who have concerns should be given an opportunity to share their concerns with the school nurse.

Scales should be professionally calibrated at least annually, tested with standard weights at least monthly, and checked and zeroed daily, and before weighing each individual. Portable scales should be calibrated each time they are moved to another location.

A. Procedure

Scale should be set at zero. The student should stand motionless in the center of the scale platform, with arms at the side, facing the scale. Paper footprints placed on the scale may be helpful in positioning the student. The measurement is taken and recorded to the nearest

.01kg or 1/4 pound. For accuracy, the student should step off the scale, the scale should be zeroed, and the student re-weighed. The measurements should be within .01kg or 1/4 pound; if not, reposition and weigh again.



See [Appendix B](#) for Instructions in Measuring Body Weight. This chart could be posted near the scale in the screening area to remind screeners of the proper steps.

B. Considerations for Special Populations

For some non-ambulatory students, or those weighing over 250 pounds, obtaining an accurate body weight in the school setting may be difficult. Schools with students in wheelchairs may investigate the use of chair scales in order to weigh this population. The parents may be consulted regarding any previous attempts to obtain a weight during a health care visit or hospitalization.

V. ASSESSING GROWTH USING NATIONAL NORMS

The screener should plot the student’s measurements on the appropriate CDC growth chart for age and gender. These can be the body mass index (BMI) for age and gender or growth charts that plot weight and height for age and gender. The use of a straight edge or ruler will assure accurate placement. If measures are inconsistent with previous growth, check plotting and re-measure if necessary. Most healthy children have stable, steady growth rates and stay within one or two “growth channels” on the growth chart from the age of two years. Any available previous measurements may be helpful in determining if there is an abnormal rate of growth. The accuracy of earlier measurements should be taken into consideration and used as a gross estimate.

Average Annual Rate of Growth

AGE GROUP	RATE OF GAIN IN HEIGHT (inches or cm per year)	WEIGHT GAIN (pounds or kg per year)
Children 6 years to 12 years	2.4 inches or 6 cm	5.5 pounds or 2.5 kg
Adolescents Boys Girls	1.2 to 4.7 inches or 3 to 12 cm 1.3 to 3.9 inches or 3.4 to 10 cm	30.8 pounds or 14 kg (at peak of growth spurt)

Growth Charts

Pediatric growth charts have been used for many years to track the physical growth of infants, children, and adolescents to determine if growth is adequate or inadequate. The CDC growth charts were revised in 2000 to improve their use as a clinical tool by health professionals. Growth charts provide a visual aid for parents to see patterns of growth in an objective way. It helps them to see that their child has a “normal” range of growth, or that the growth, or rate of growth is above or below the norm for age and gender. Infants and children are measured at each visit for health care to provide the multiple measurements needed to see the rate of growth over time.

Body Mass Index

The Body Mass Index (BMI) is a weight for stature index that can be used to determine whether the student is within a normal growth pattern, overweight, at risk for overweight or underweight. BMI has been used to assess obesity in adults, and has been adapted for children and adolescents to provide consistency across age groups. The BMI is reliable, non-intrusive and has been validated against measures of body density. The BMI is a screening tool and not a definitive measure for overweight and obesity. Physically active students, i.e., athletes and dancers, may have a high BMI due to increased muscle mass that weighs more than fat mass. The BMI upper weight limit is 250 pounds and the BMI measures only to 35.0.

A. PROCEDURE FOR DETERMINING BMI

1. Use the appropriate National Center for Health Statistics (NCHS) BMI for age and gender percentile growth chart to plot the BMI, or use a computer application to determine BMI. Devices such as a BMI wheel for children or BMI calculator are commercially available, and computer applications can be found in numerous locations on the internet. Some computer applications can be used to track growth over time for individuals (see Appendix G, Resources).
2. Document the BMI on the student’s health record.
3. Provide notification to a parent/guardian regarding the student’s growth assessment in a timely manner. If indicated, educational materials may be provided with the information regarding the student’s screening. It is important that all parent(s)/guardian(s) be provided the results of the assessment to avoid singling out those students with an abnormal rate of growth (see Appendix E, Sample Notification Letter to Parents).

B. Considerations for Special Populations

Students with special health care needs may have different growth patterns due to their disease or nutritional disorders. Special growth charts have been developed to assess growth of children with certain conditions. CDC recommends using the BMI charts or other standardized growth charts for all children, and does not recommend using the special charts.

The original BMI charts were developed to assess the nutritional status of adolescents during pregnancy, and to determine appropriate gestational weight gain. Special prenatal charts should be used to assess pregnant teens.

VI. REFERRAL CRITERIA FOR GROWTH ASSESSMENTS

The CDC convened a group of experts to reach a consensus on the management of overweight children and adolescents. These experts recommend that children who are overweight, according to the BMI for age (at or above the 95th percentile) should be referred for an in-depth medical assessment. Those whose BMI indicates they are at risk for overweight (at or above the 85th percentile) should be further screened for a family history of obesity or obesity-related diseases, blood pressure, total cholesterol, large change in BMI (more than two percentile channels) or family concern about weight. If any of these factors are present, the student should be referred for an in-depth medical assessment. If all those risk factors are negative, the student's growth should be monitored (See Appendices C and D for referral protocols).

Appendix A

Instructions for Measuring Height

1. Shoes are taken off; hat removed; pigtails, etc., should not be in the way.
2. Student stands on flat surface; heels slightly apart and flat on the floor.
3. Back straight as possible; knees should not be bent.
4. Heels, buttocks, and shoulder blades touch wall or measuring surface.
5. Arms hang naturally to side; shoulders relaxed.
6. Looking forward – eyes straight ahead.
7. Ask student to inhale deeply and hold his/her breath while being measured.
8. Lower headboard until it touches crown of head firmly.
9. Read measurement to the nearest 0.1cm or 1/8 inch, make note of first measurement.
10. Move headboard away; check posture and repeat.
11. Measurements should agree within 0.1cm or 1/8 inch.
12. If measurements do not agree within 0.1 cm or 1/8th inch, re-measure and record the average of the two measurements.
13. Record measurement on the student health record.



Appendix B

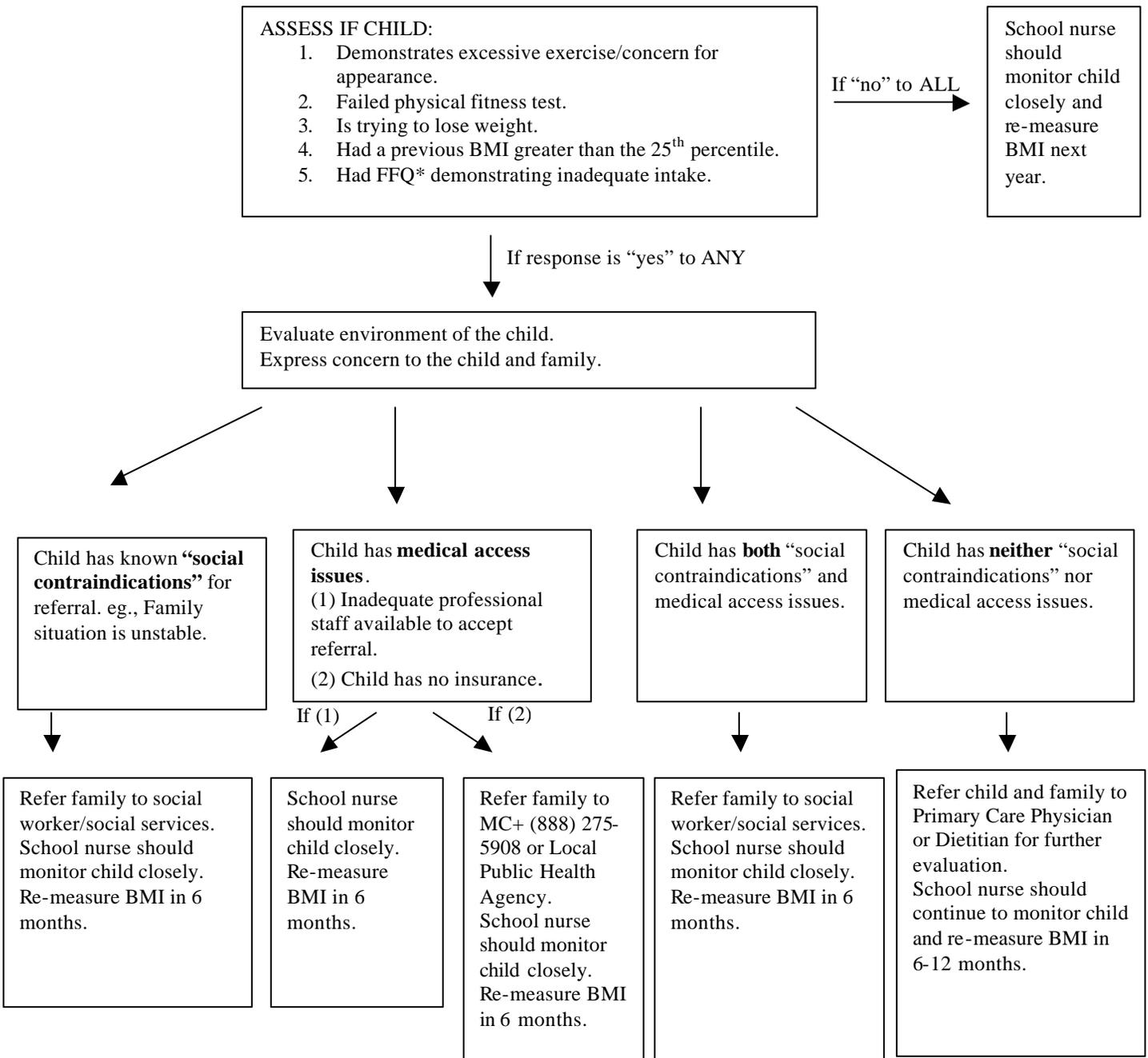
Instructions for Measuring Body Weight

1. Scale balanced at zero.
2. Shoes off, heavy outer clothing off, such as a sweater and jacket.
3. Student stands straight in center of platform.
4. Arms hang naturally at side.
5. Student is looking forward.
6. Read measurement to the nearest .01 kg or 1/4th pound; make note of first measure.
7. Have student step off of scale and take the second measurement; repeating steps above.
8. Measurements should agree within .01 kg or 1/4th pound.
9. If measurements do not agree within .01 kg or 1/4th pound, re-measure until this standard is met.
10. Record measurement on the student health record.



Appendix C

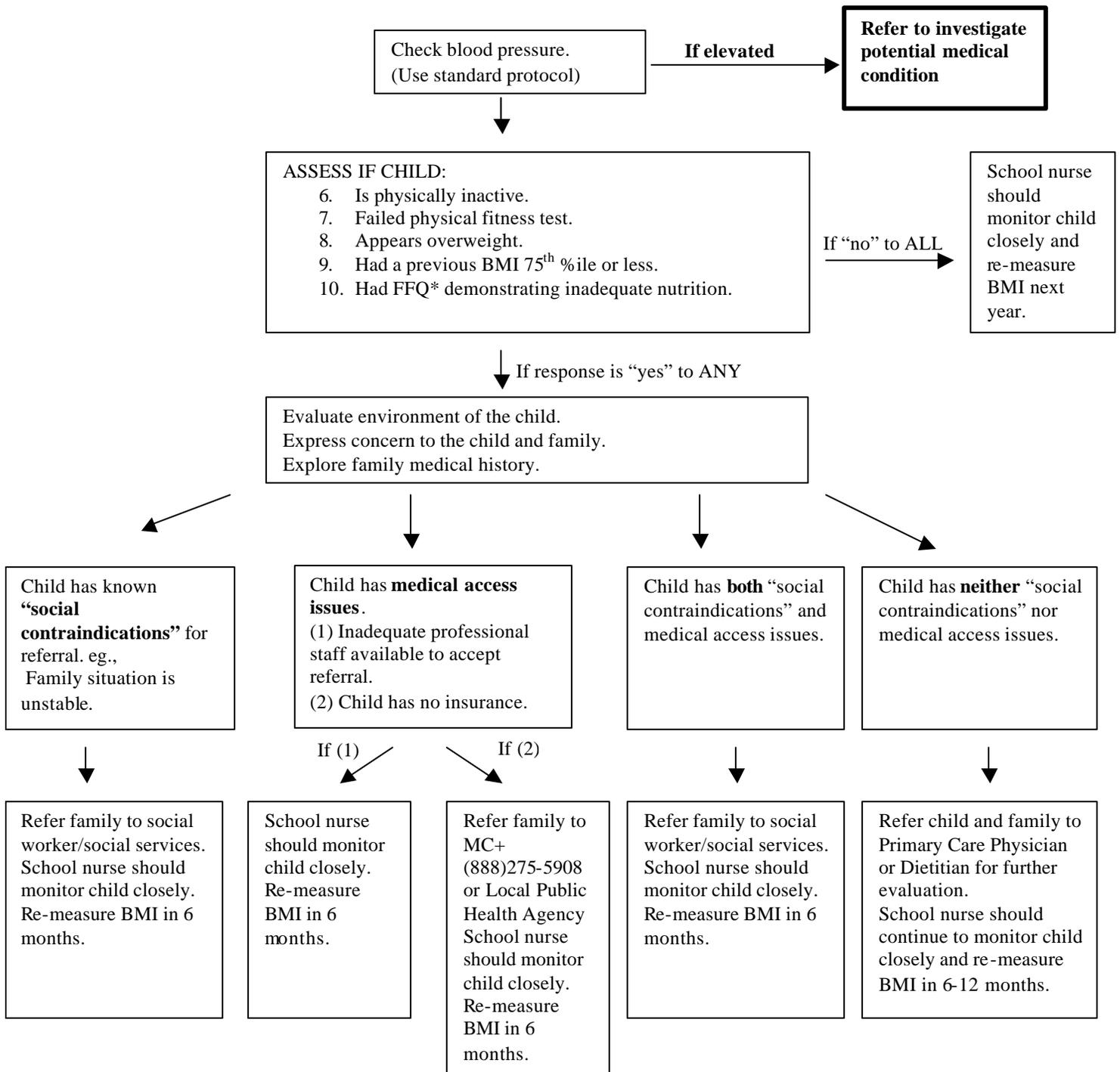
Children with BMI less than or equal to the 5th percentile:



*Food Frequency Questionnaire or other diet recall tool.

Appendix D

Children with BMI greater than or equal to the 95th percentile:



*Food Frequency Questionnaire or other diet recall tool.

Diagram Tree #2

Appendix E

SAMPLE NOTIFICATION LETTER TO PARENTS
(district letter head)

Growth Screening Program

(Date)

Dear Parent/Guardian:

_____ was weighed and measured as part of our growth screening program. A Body Mass Index (BMI)* was also calculated to use as a guideline to assess the overall growth and nutritional status. His/her measurements were

_____ height _____ weight _____ BMI for age

Being overweight or underweight for age can put a person at risk for certain health problems. A student who is overweight has an increased risk of developing serious chronic health conditions including diabetes, heart disease, high blood pressure, strokes and certain cancers. A student who is underweight has an increased risk for heart problems, loss of bone mass and anemia. Underweight may also be a sign of an underlying eating disorder.

Many factors, including sports participation or family history, can influence height and weight in children and adolescents. The BMI is only a screening tool, but provides an indication if the child or adolescent should have further evaluation.

Your child's health care provider is the best person to evaluate whether or not his/her growth is within a healthy range. Please share the results with your child's provider, who may suggest changes in eating or physical activity or may have some other recommendations.

If you have any questions, please call the school nurse at _____

Respectfully,

School Nurse

BMI less than 5th percentile – underweight
BMI between 85th and 95th percentile – at risk for overweight
BMI 95th percentile or higher – overweight

Source: Centers for Disease Control and Prevention (CDC)
US Department of Health and Human Services
www.cdc.gov/growthcharts

Appendix F

SCHOOL-BASED INTERVENTIONS

Schools can play a proactive role in helping students achieve healthy weight by offering support and guidance. A recent survey (2004) of Missouri school nurses indicated that their school district addressed growth concerns using some of the following interventions. Most school nurses reported their school used one to five of the following strategies to address this issue:

1. Use of *School Health Index* to assess the school nutrition and physical activity environment and to develop an action plan;
2. Use of *Changing the Scene* to assess the school nutrition policies and practices;
3. Use of a Coordinated School Health approach to address the issue;
4. School policy changes addressing school nutrition and physical environment;
5. Removal of non-nutritious snacks and sugary beverages;
6. Restricting access to vending machines at specific times;
7. Improving school meals to reduce fat, sugar, and salt content, and increase the use of fresh fruits and vegetables;
8. Identification of community resources to assist in weight management;
9. Increased time and space for meals at school;
10. Increased nutrition education in the curriculum;
11. Working with families to increase physical activity and improve nutrition;
12. Identification of community resources for physical activity and healthy eating;
13. Development of a set of recommendations for school personnel to use if a student approaches a staff person regarding weight loss;
14. Increased physical activity opportunities during the school day; and
15. Implementation of a school-based weight management program

Other strategies include:

- Establish a support group for students at highest risk for obesity, and offer special programs;
- Develop and keep current a list of community resources for recreation and after-school activities;
- Encourage the consumption of low-fat, not necessarily fat-free, products;
- Encourage the intake of five or more fruits and vegetables every day;
- Encourage increased consumption of water and moderation in consuming sweetened beverages;
- Encourage 30-60 minutes of cumulative physical activity, at least five days a week;
- Encourage walking to school as a way to incorporate physical activity. Safety issues should be discussed when suggesting this intervention;
- Encourage team sports for children who enjoy these activities; and
- Encourage family activity whenever possible.

For information regarding resources for some of the interventions listed, please contact the School Health Services program at the Missouri Department of Health and Senior Services, at 573-751-6213 or refer to [Appendix G](#), Resources.

Appendix G

RESOURCES

Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Division of Nutrition and Physical Activity

At this site, under Topics, select Body Mass Index, then BMI for Children and Teens. There is a link to the CDC Growth Chart Training Modules which includes measuring height and weight and calculating BMI.

www.cdc.gov/nccdphp/dnpa

National Heart, Lung, and Blood Institute Information Center, Obesity Education Initiative

The home page also contains a link for calculating BMI.

www.nhlbi.nih.gov/about/oei/index.htm

**U.S. Department of Health and Human Services
Health Resources and Services Administration
Maternal and Child Health Bureau**

Growth Charts Training – a site offering a set of self-directed, interactive training modules for health care professionals using the new (2000) pediatric growth charts in clinical and public health settings to assess growth.

<http://depts.washington.edu/growth>

University of California-Berkeley

Guidelines for Collecting Height and Weight in Children and Adolescents in School Settings. This is a 2-page brochure in pdf format that contains general information about assessing children.

www.cnr.berkeley.edu/cwh/PDFs/

USDA

This is an interactive site that can be used **with students**. The student can enter a 24-hour diet history and receive a detailed computerized analysis of their dietary intake in comparison with the Food Guide Pyramid and the Healthy Eating Index.

www.usda.gov/ncpp

National Cancer Institute's 5 a Day Program

Interactive site **for students** to log fruit and vegetable intake and minutes of physical activity. Promotional materials available in limited quantities for the cost of shipping and handling.

www.5aday.gov

Pediatric Parenting Advice

This website provide **parenting** advice regarding growth and nutrition, and an easy-to-use BMI calculator for children.

www.keepkidshealthy.com

Agency for Healthcare Research and Quality

This site provides DVD's for parents and professionals related to child obesity:

1) For **parents and kids**, a DVD titled "Max's Magical Delivery: Fit for Kids" – a 30 minute program geared to 5- to 9-year olds. 2) For **professionals**, a DVD titled "Childhood Obesity: Combating the Epidemic" – 55 minute program with panel discussion, tools for BMI measurements and tips for initiating behavior change. These DVDs can be ordered on-line, free of charge.

www.ahrpr.gov/child

USDA/ARS Children's Nutrition Research Center at Baylor College of Medicine Children's BMI and Percentile Graph Calculator

Based on revised growth charts from CDC, provides a "snapshot" of a child's weight and height for age, including BMI and BMI Percentile. It also plots the child's BMI percentile on a growth chart, which is printable. **This is a site for parents**, and contains information regarding how to interpret the chart, why and when a child needs help regarding weight. There is also an "energy" calculator and adult BMI calculator.

www.kidsnutrition.org

Shaping America's Youth (SAY)

This is a web-based database that provides information on programs designed to increase physical activity and improve nutrition in children and adolescents. Access ideas from over 500 childhood weight intervention programs submitted by school and community groups. Provides a program search by various topics, including a category, "school-related programs."

www.shapingamericasyouth.com

Dole 5 a Day for Kids Program

Free educational material to all elementary schools and special education classes.

www.dole5aday.com

Missouri Department of Health and Senior Services

On the department's website, click on "Health" for a listing of programs, click on "School Health" to access information about school health programs, or click on "Nutrition" for information about nutrition and growth. There are many links to information regarding overweight children on the Nutrition homepage.

www.dhss.state.mo.gov

Missouri Obesity Prevention Plan 2005

This is a multi-disciplinary approach to the prevention of obesity in our state. (will be available on Department of Health and Senior Services website when completed) www.dhss.state.mo.gov

MISSOURI DEPARTMENT OF HEALTH AND SENIOR SERVICES

**DIVISION OF COMMUNITY HEALTH
Section for Community Health Systems and Support
Healthy Communities and Schools Unit**

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